

Class	Freq	State	City	Licensee	Latitude	Longitude	Directional Antenna?	Spacing (km)		
								Actual	73.209	Short
B	93.3	Ohio	Cincinnati	Pillar of Fire	N 39 12 22	W 84 33 23	Directional Antenna	71	74	3
B	92.9	Ohio	Eaton	Great Trails Broadcasting Corp.	N 39 50 10	W 84 24 16				
B	97.9	Indiana	Anderson	Anderson Radio GP.	N 40 3 43	W 85 42 34		66	69	3
A	98.3	Indiana	Plainfield	Radio One Five Hundred Inc.	N 39 45 33	W 86 22 30				
B	94.7	California	Los Angeles	Group W Radio Inc (LA)	N 34 13 29	W 118 3 47		71	74	3
B	95.1	California	San Bernardino	Amaturo Group Ltd.	N 34 11 51	W 117 17 10				
A	93.5	Pennsylvania	Stroudsburg	Commonwealth B/Cting Company Inc.	N 40 56 56	W 75 9 29		66	69	3
B	92.9	Pennsylvania	Wilkes-Barre	Warm Broadcasting Co Inc.	N 41 10 58	W 75 52 26				
B	107.3	Indiana	Warsaw	WRSW Broadcasting Inc	N 41 13 21	W 85 50 17		71	74	3
B	106.9	Indiana	Marion	Bomar Broadcasting Company	N 40 35 52	W 85 39 21				
B	106.1	California	San Francisco	Evergreen Media Corporation	N 37 41 24	W 122 26 13		71	74	3
B	105.7	California	Santa Clara	Santa Clara Broadcasters Inc.	N 37 21 32	W 121 45 22				
B	104.3	Ohio	East Liverpool	The Co.strander Corp	N 40 37 48	W 80 36 10	Directional Antenna	71	74	3
B	104.7	Pennsylvania	Pittsburgh	ECI License Company LP.	N 40 34 24	W 79 46 58				
B	105.7	California	Santa Clara	Santa Clara Broadcasters Inc	N 37 21 32	W 121 45 22		71	74	3
B	105.3	California	San Francisco	Entertainment Communications Inc.	N 37 41 20	W 122 26 7				
B	105.7	California	Santa Clara	Santa Clara Broadcasters Inc.	N 37 21 32	W 121 45 22		71	74	3
B	106.1	California	San Francisco	Evergreen Media Corporation	N 37 41 24	W 122 26 13				
B	106.5	California	San Jose	Alta Broadcasting Company	N 37 21 43	W 121 45 23		71	74	3
B	106.1	California	San Francisco	Evergreen Media Corporation	N 37 41 24	W 122 26 13				
B	105.3	California	San Francisco	Entertainment Communications Inc.	N 37 41 20	W 122 26 7		71	74	3
B	105.7	California	Santa Clara	Santa Clara Broadcasters Inc.	N 37 21 32	W 121 45 22				
B	105.1	Ohio	Cincinnati	Chancellor Broadcasting Licensee Company	N 39 7 31	W 84 29 57		71	74	3
B	104.7	Ohio	Dayton	American Radio Systems License Corporation	N 39 43 19	W 84 12 36				
B	106.1	California	San Francisco	Evergreen Media Corporation	N 37 41 24	W 122 26 13		71	74	3
B	106.5	California	San Jose	Alta Broadcasting Company	N 37 21 43	W 121 45 23				

Class	Freq	State	City	Licensee	Latitude	Longitude	Directional Antenna?	Spacing (km)		
								Actual	73.209	Short
B	104.7	Pennsylvania	Pittsburgh	ECI License Company LP.	N 40 34 24	W 79 46 58				
B	104.3	Ohio	East Liverpool	The Co.strander Corp.	N 40 37 48	W 80 36 10	Directional Antenna	71	74	3
B	104.7	Ohio	Dayton	American Radio Systems License Corporation	N 39 43 19	W 84 12 38				
B	105.1	Ohio	Cincinnati	Chancellor Broadcasting Licensee Company	N 39 7 31	W 84 29 57		71	74	3
B	102.9	Maryland	Cumberland	Tschudy Communications Corp.	N 39 34 56	W 78 53 53				
B	102.5	Virginia	Winchester	Benchmark Radio Acquisition Fund II Ltd Partnshp	N 39 10 38	W 78 15 53		71	74	3
B	106.9	Indiana	Marion	Bomar Broadcasting Company	N 40 35 52	W 85 39 21				
B	107.3	Indiana	Warsaw	WRSW Broadcasting Inc.	N 41 13 21	W 85 50 17		71	74	3
B	102.7	Maryland	Baltimore	Infinity of Chesapeake License Corporation	N 39 23 11	W 76 43 52				
B	103.3	Pennsylvania	York	Susquehanna Radio Corporation	N 40 1 38	W 76 36 0		72	74	2
B	92.3	Indiana	Hammond	Dontron Inc.	N 41 37 50	W 87 31 40	Directional Antenna			
A	92.7	Illinois	Arlington Heights	Darrel Peters Productions Inc.	N 42 7 50	W 87 58 59		67	69	2
A	93.5	New York	Ithaca	Cornell Radio Guild Inc.	N 42 25 42	W 76 26 57				
B	93.1	New York	Syracuse	Pilot Communications LLC.	N 42 56 47	W 76 1 32		67	69	2
B	102.7	California	Los Angeles	Pacific & Southern Co Inc.	N 34 13 36	W 118 3 57	Directional Antenna			
A	103.1	California	Newport Beach	Brentwood Communications LP.	N 33 37 55	W 117 56 15		67	69	2
A	92.7	Illinois	Arlington Heights	Darrel Peters Productions Inc	N 42 7 50	W 87 58 59				
B	92.3	Indiana	Hammond	Dontron Inc.	N 41 37 50	W 87 31 40	Directional Antenna	67	69	2
B	93.1	New York	Syracuse	Pilot Communications LLC	N 42 56 47	W 76 1 32				
A	93.5	New York	Ithaca	Cornell Radio Guild Inc.	N 42 25 42	W 76 26 57		67	69	2
A	103.1	California	Newport Beach	Brentwood Communications LP	N 33 37 55	W 117 56 15				
B	103.5	California	Los Angeles	KFI Inc.	N 34 13 32	W 118 3 52		67	69	2
B	107.5	Pennsylvania	Boyertown	WDAC Radio Company	N 40 24 15	W 75 39 9	Directional Antenna			
B	106.9	New Jersey	Camden	Family Stations Inc.	N 39 54 33	W 75 6 0		72	74	2
B	106.1	Michigan	Jackson	Regional Hit Radio Inc.	N 42 23 28	W 84 37 22				
B	106.5	Michigan	Kalamazoo	Fairfield Broadcasting Inc.	N 42 28 32	W 85 29 22		72	74	2

Class	Freq	State	City	Licensee	Latitude	Longitude	Directional Antenna?	Spacing (km)		
								Actual	73.209	Short
B	103.3	Michigan	Battle Creek	Crystal Radio Group Inc	N 42 21 19	W 85 20 28		72	74	2
B	102.9	Michigan	Grand Rapids	Furniture City Broadcasting Corporation	N 42 57 13	W 85 41 55				
B	105.9	Virginia	Woodbridge	Viacom Broadcasting East Inc.	N 38 52 28	W 77 13 24	Directional Antenna	72	74	2
B	106.5	Maryland	Baltimore	WWMX Inc.	N 39 20 10	W 76 38 59				
A	103.1	California	Newport Beach	Brentwood Communications LP	N 33 37 55	W 117 56 15		67	69	2
B	102.7	California	Los Angeles	Pacific & Southern Co Inc.	N 34 13 36	W 118 3 57	Directional Antenna			
B	105.9	New Jersey	Newark	Multicultural Broadcasting Inc.	N 40 45 4	W 73 58 37		46	48	2
A	105.5	New Jersey	Dover	Signal Communications of New Jersey Ltd Prtnrshp	N 40 51 19	W 74 30 42				
B	106.9	New Jersey	Camden	Family Stations Inc	N 39 54 33	W 75 6 0		72	74	2
B	107.5	Pennsylvania	Boyetown	WDAC Radio Company	N 40 24 15	W 75 39 9	Directional Antenna			
B	103.3	Pennsylvania	York	Susquehanna Radio Corporation	N 40 1 38	W 76 36 0		72	74	2
B	102.7	Maryland	Baltimore	Infinity of Chesapeake License Corporation	N 39 23 11	W 76 43 52				
B	102.9	Michigan	Grand Rapids	Furniture City Broadcasting Corporation	N 42 57 13	W 85 41 55		72	74	2
B	103.3	Michigan	Battle Creek	Crystal Radio Group Inc.	N 42 21 19	W 85 20 28				
B	103.5	California	Los Angeles	KFI Inc.	N 34 13 32	W 118 3 52		67	69	2
A	103.1	California	Newport Beach	Brentwood Communications LP.	N 33 37 55	W 117 56 15				
A	105.5	New Jersey	Dover	Signal Communications of New Jersey Ltd Prtn	N 40 51 19	W 74 30 42		46	48	2
B1	105.9	New Jersey	Newark	Multicultural Broadcasting Inc.	N 40 45 4	W 73 58 37				
C	105.1	Alabama	Albertville	Sand Mountain B/Cting Service Inc	N 34 9 27	W 86 2 44		103	105	2
C	104.7	Alabama	Birmingham	Newcity Communications of AlabamaIn.	N 33 29 2	W 86 48 21				
B	106.5	Maryland	Baltimore	WWMX Inc	N 39 20 10	W 76 38 59		72	74	2
B	105.9	Virginia	Woodbridge	Viacom Broadcasting East Inc.	N 38 52 28	W 77 13 24	Directional Antenna			
C	104.7	Alabama	Birmingham	Newcity Communications of AlabamaIn	N 33 29 2	W 86 48 21		103	105	2
C	105.1	Alabama	Albertville	Sand Mountain B/Cting Service Inc.	N 34 9 27	W 86 2 44				
B	106.5	Michigan	Kalamazoo	Fairfield Broadcasting Inc	N 42 28 32	W 85 29 22		72	74	2
B	106.1	Michigan	Jackson	Regional Hit Radio Inc.	N 42 23 28	W 84 37 22				

Class	Freq	State	City	Licensee	Latitude	Longitude	Directional Antenna?	Spacing (km)		
								Actual	73.209	Short
C	96.1	North Carolina	Raleigh	Alchemy Communications Ltd Partnership	N 35 41 7	W 78 43 14				
C	95.7	North Carolina	Lumberton	Beasley B/Casting of Eastern NC Inc.	N 34 46 53	W 79 2 42	Directional Antenna	104	105	1
C	95.1	Kentucky	Glasgow	Heritage Communications Inc.	N 36 54 43	W 86 11 21				
C	95.5	Tennessee	Nashville	WSM Inc.	N 36 8 27	W 86 51 56		104	105	1
B	95.1	Michigan	Flint	Flint Board of Education	N 43 1 13	W 83 40 40	Directional Antenna			
B	95.5	Michigan	Detroit	Broadcasting Partners of Detroit Inc.	N 42 28 22	W 83 11 59		73	74	1
B	95.5	Michigan	Detroit	Broadcasting Partners of Detroit Inc	N 42 28 22	W 83 11 59				
B	95.1	Michigan	Flint	Flint Board of Education	N 43 1 13	W 83 40 40	Directional Antenna	73	74	1
C	95.7	North Carolina	Lumberton	Beasley B/Casting of Eastern NC Inc.	N 34 46 53	W 79 2 42	Directional Antenna			
C	96.1	North Carolina	Raleigh	Alchemy Communications Ltd Partnership	N 35 41 7	W 78 43 14		104	105	1
B	99.1	Ohio	Dayton	WHIO Inc	N 39 44 2	W 84 14 52				
B	98.5	Ohio	Cincinnati	Radio Cincinnati Inc.	N 39 7 19	W 84 32 52		73	74	1
B	96.3	Illinois	Chicago	CBS Inc.	N 41 52 44	W 87 38 10	Directional Antenna			
B	96.9	Illinois	Zion	Northern II Broadcasting Co Inc.	N 42 30 36	W 87 53 11	Directional Antenna	73	74	1
B	98.5	Ohio	Cincinnati	Radio Cincinnati Inc.	N 39 7 19	W 84 32 52				
B	99.1	Ohio	Dayton	WHIO Inc.	N 39 44 2	W 84 14 52		73	74	1
C	95.5	Tennessee	Nashville	WSM Inc	N 36 8 27	W 86 51 56				
C	95.1	Kentucky	Glasgow	Heritage Communications Inc.	N 36 54 43	W 86 11 21		104	105	1
B	96.9	Illinois	Zion	Northern II Broadcasting Co Inc	N 42 30 36	W 87 53 11	Directional Antenna			
B	96.3	Illinois	Chicago	CBS Inc.	N 41 52 44	W 87 38 10	Directional Antenna	73	74	1
A	92.1	California	Walnut Creek	Diamond Broadcasting of California Inc.	N 37 53 59	W 122 5 38				
A	92.7	California	Alameda	KZSF Broadcasting Inc.	N 37 47 54	W 122 24 59		30	31	1
A	92.7	California	Alameda	KZSF Broadcasting Inc	N 37 47 54	W 122 24 59				
A	92.1	California	Walnut Creek	Diamond Broadcasting of California Inc.	N 37 53 59	W 122 5 38		30	31	1
B	105.1	Michigan	Detroit	Marlin Broadcasting Inc	N 42 28 16	W 83 12 3				
B1	105.5	Michigan	Flint	Majac of Michigan Inc.	N 43 0 38	W 83 39 9	Directional Antenna	70	71	1

Class	Freq	State	City	Licensee	Latitude	Longitude	Directional Antenna?	Spacing (km)		
								Actual	73.209	Short
B	105.5	Michigan	Flint	Majac of Michigan Inc	N 43 0 38	W 83 39 9	Directional Antenna	70	71	1
B	105.9	Michigan	Detroit	Bell Broadcasting Company	N 42 28 16	W 83 12 3	Directional Antenna			
B	105.9	Michigan	Detroit	Bell Broadcasting Company	N 42 28 16	W 83 12 3	Directional Antenna	70	71	1
B1	105.5	Michigan	Flint	Majac of Michigan Inc.	N 43 0 38	W 83 39 9	Directional Antenna			
B	105.9	Ohio	Middletown	Radio Stations WPAY/WPFB Inc	N 39 30 57	W 84 21 5		73	74	1
B	106.5	Ohio	Greenville	Treaty City Broadcasting Corp.	N 40 8 49	W 84 36 36				
B	106.5	Ohio	Greenville	Treaty City Broadcasting Corp.	N 40 8 49	W 84 36 36		73	74	1
B	105.9	Ohio	Middletown	Radio Stations WPAY/WPFB Inc.	N 39 30 57	W 84 21 5				
B	105.5	Michigan	Flint	Majac of Michigan Inc	N 43 0 38	W 83 39 9	Directional Antenna	70	71	1
B	105.1	Michigan	Detroit	Marlin Broadcasting Inc.	N 42 28 16	W 83 12 3				

APPENDIX II

**FM Receiver Performance in the Presence of
Second Adjacent Channel Interference**

October 4, 1996

Thomas B. Keller
T. Keller Corporation

FM RECEIVER SECOND ADJACENT TESTS

Introduction

Industry sponsored digital radio laboratory tests were conducted at the NASA Research Center, Cleveland, Ohio, in a laboratory operated by the Electronics Industries Association Consumer Electronics Manufacturers Association. The EIA/CEMA Subcommittee on Digital Audio Radio has completed the laboratory tests of seven digital sound broadcasting systems for digital radio. The In-Band On Channel (IBOC) tests were done in collaboration with the National Radio Systems Committee (NRSC). Of seven systems tested in the laboratory, four systems operate in the VHF 88-108 MHz FM band.

Digital audio radio in-band compatibility tests required the use of reference FM receivers for co-channel, first adjacent, and second adjacent compatibility tests. With the endorsement of the digital radio subcommittees, five FM receivers representative of the FM band receiver population were selected. To certify these receivers, extensive characterization tests were conducted at the DAR Transmission Laboratory (NASA Lewis) and at an independent laboratory (Woodstock Engineering). The results of the complete digital audio radio tests are available from the EIA/CEMA. The data used (Appendix A) is from the Digital Audio Radio Test Report, Volume I, Appendix H: Receiver Characterization.

Compatibility Receivers

The reference FM receiver selection by the DAR subcommittees was divided into four categories: auto, portable, home Hi-Fi high end, and Hi-Fi competitive. The two automobile receivers were selected because they represented a large population, and they differed in the application of stereo blend. Both of the auto radios showed high second adjacent channel rejection. The high end home Hi-Fi, portable, and competitive Hi-Fi receivers were essentially broadband receivers and more sensitive to second adjacent channel interference. The selectivity circuitry in the five receivers is representative of the receiver population in the United States.

Laboratory Receiver Characterization Tests

Appendices A through E are copies of selected pages of the digital radio laboratory FM analog characterization report. The pages selected are those that are applicable to second adjacent channel interference. A report for each of the five receivers is included. Page 1 of each report specifies the receiver make and model, measured signal level, and noise standard used for the individual receiver. The 45 dB quasi-peak signal-to-noise ratio is used for comparing

receiver susceptibility to second adjacent channel interference and not for the establishment of D/U protection ratios.

Page 2 of each receiver report is a tabular report of the signal, noise, and separation versus RF level. The next page is a composite plot of the data on page 2. RMS measurements were used for these tests.

Pages 4 and 5 of each report show the lower and upper second adjacent channel interference measurements. Because tests showed that receiver #5 is not sensitive to second adjacent interference, no further tests were conducted on this receiver. The second adjacent signal-to-noise ratio versus D/U was measured over a D/U range of -20 dB to a D/U of -46 dB. The -46 dB D/U was the upper limit of the test-bed for this test. The undesired signal level attenuator was decreased in 1 dB steps for the range of the tests. Lower second adjacent signal-to-noise versus D/U was measured over shorter ranges.

Description of Table

Table 1 shows an analysis of the 2nd adjacent data found on pages 4 and 5 of the laboratory receiver characterization reports. Using a 35 dB quasi-peak signal-to-noise, the D/U for each receiver is found. The audio noise measurement was made using quasi-peak detection, a 15 kHz low pass filter, and the CCIR filter. The desired signal level was -62 dBm at the receiver input. Antenna matching networks were used for the auto receivers. The portable and home receivers were tested in a shielded box that eliminated interference from other electronic devices in the laboratory. The two auto receivers did not require additional shielding. The noise measurements were conducted with the 19 kHz pilot on the desired signal and the receiver in the stereo mode. The undesired audio signal modulation was clipped pink noise.

Table 2 shows an analysis of the 2nd adjacent data found on pages 4 and 5 of the laboratory receiver characterization reports. The signal-to-noise ratio is shown for each receiver with four D/U settings: -20 dB, -30 dB, -40 dB, and -46 dB. Unless otherwise indicated, the noise measurements are the average of the upper and lower adjacent channel tests.

The quasi-peak noise measurements will generally show a 10 dB lower signal-to-noise ratio than RMS measurements.

Test Results

Automobile receivers #1 and #5 showed no significant increase in noise with the addition of 26 dB of interference. These receivers were second adjacent interference proof.

Hi-Fi high end receiver #2 had a 16 dB drop in signal-to-noise ratio when the interference was

increased from a D/U of -20 dB to a D/U of -40 dB.

Receiver #3 is a manually tuned receiver and was tuned for the lowest audio distortion. For the -20 dB D/U, a 26 dB difference in the S/N for the upper and lower second adjacent channel was measured.

Receiver #4 had a nearly linear increase in noise with an increase in second adjacent signal.

TABLE 1		
SECOND ADJACENT RECEIVER D/U with a 35 dB S/N		
(Desired signal -62 dBm at receiver input)		
Receiver	Type	D/U with 35 dB S/N
#1	Auto	Better than -48 dB D/U test-bed limit
#2	Hi-Fi high end with RBDS decoder	-40 dB
#3	Portable	-17 dB
#4	Hi-Fi competitive	-26 dB
#5	Auto	Better than -48 dB D/U test-bed limit

Tests were conducted at the DAR Laboratory, NASA Lewis, Cleveland.

This measurement was made using quasi-peak detection, a 15 kHz low pass filter, and the CCIR filter.

Audio S/N is quasi-peak.

The D/U is the average of the upper and lower tests.

TABLE 2

SECOND ADJACENT RECEIVER S/N with a -20, -30, -40 and -46 dB D/U

(Desired signal -62 dBm at receiver input)

Receiver	Type	S/N at a D/U of -20 dB	S/N at a D/U of -30 dB D/U	S/N at a D/U of -40 dB (D/U specified in FCC 73.215)	S/N at a D/U of -46 dB (test-bed limit)
#1	Auto	47 dB	46 dB	47 dB	45 dB
#2	Hi-Fi high end with RBDS decoder	51 dB	45 dB	35 dB	Not tested
#3	Portable	36 dB Average 49 dB Lower Adj 23 dB Upper Adj	31 dB Lower Adj Up Adj Lower than 5 dB	15 dB Lower estimated Up Adj Lower than 5 dB	Interference beyond measurement
#4	Hi-Fi competitive	41 dB	31 dB	19 dB Upper adj only	15 dB Upper adj only
#5	Auto	No interference	No interference	No interference	No interference

This measurement was made using quasi-peak detection, a 15 kHz low pass filter, and the CCIR filter.

Audio S/N is quasi-peak.

Unless otherwise indicated the S/N is the average of the upper and lower tests.

Appendix A
Receiver Test Data

Laboratory Receiver #1

FM -> FM Laboratory Measurements for the Delco Model 16192463

Type: Auto

Measurements were made at a moderate signal level of -62 dBm.

The signal to noise ratio was set at 45 dB and this measurement was made using a 15kHz low pass and a CCIR filter with quasi-peak detection. For the second adjacent tests, 45 dB S/N was not attainable on the test bed with this receiver so 47 dB was used.

Test Results:

Co-Channel	D/U	36.17 dB
Lower First Adjacent	D/U	4.09 dB
Upper First Adjacent	D/U	5.41 dB
Lower Second Adjacent	D/U	-46.00 dB
Upper Second Adjacent	D/U	-46.00 dB

SIGNAL, NOISE & SEPARATION VS RF LEVEL

- Left channel used as the measurement channel for Signal and Noise data
- Left channel driven (L only) for separation data
- Audio test frequency = 1KHZ
- Note: There were no significant improvements in performance at RF levels above 62dBm

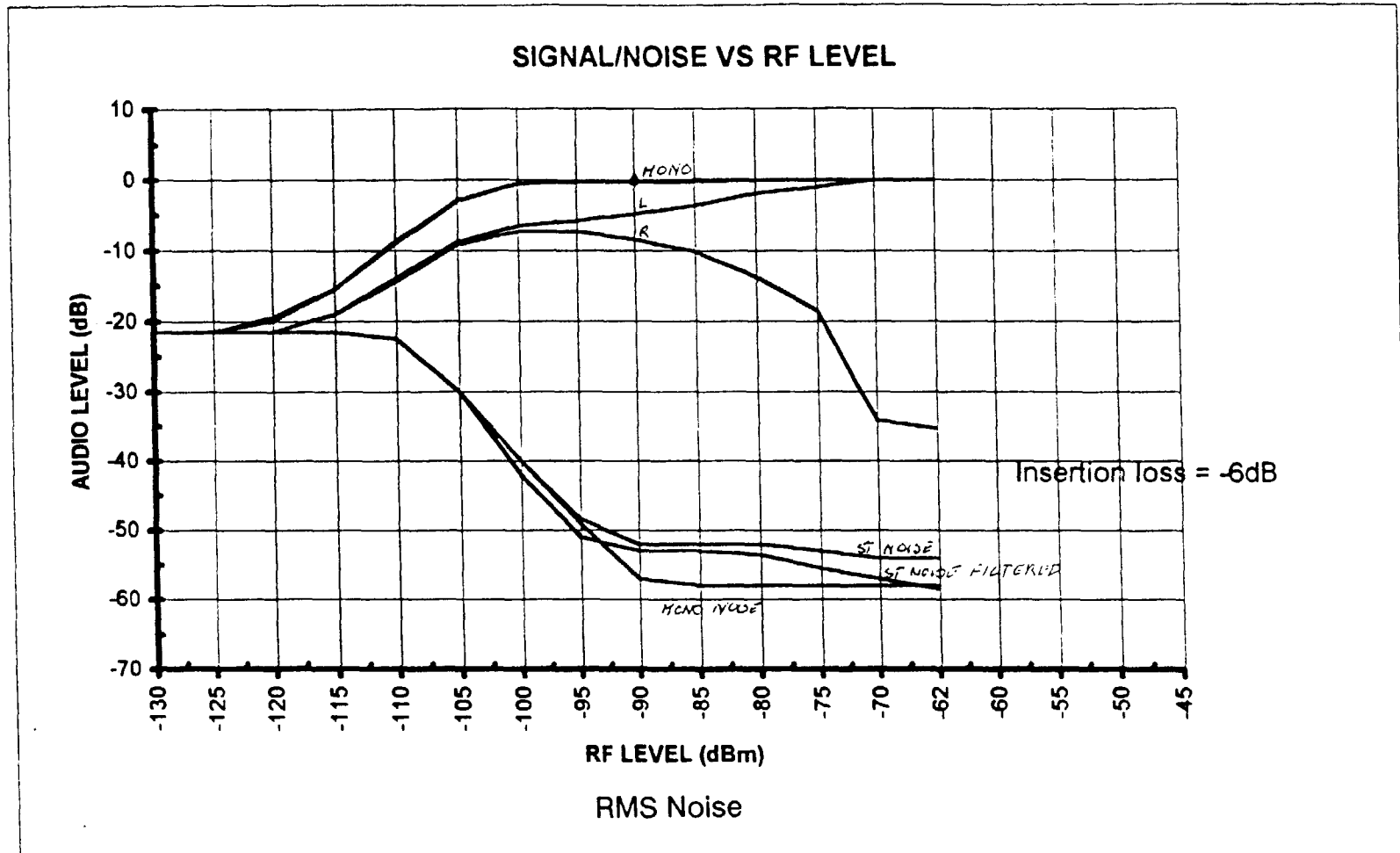
CURVE DATA

SIGNAL, NOISE & SEPARATION VS RF LEVEL

RF Level	mono (L)		Stereo (L)			RF Level	Separation L -> R	
	Signal	Noise	Signal	Filt. Noise	Noise		Left	Right
dBm	dB	dB	dB	dB	dB	dBm	dB	dB
-130	-21.5	-21.5	-21.5	-21.5	-21.5	-130	-21.5	-21.5
-125	-21.5	-21.5	-21.5	-21.5	-21.5	-125	-21.5	-21.5
-120	-19.5	-21.5	-20	-21.5	-21.5	-120	-21.5	-21.5
-115	-15.5	-21.5	-15.5	-21.5	-21.5	-115	-19	-19
-110	-8.7	-22.5	-9	-22.5	-22.5	-110	-14	-14.5
-105	-2.9	-30	-3	-30	-30	-105	-8.75	-9.2
-100	-0.52	-40	-0.57	-42	-40	-100	-6.5	-7.3
-95	-0.23	-49	-0.29	-51	-48.4	-95	-5.8	-7.3
-90	-0.21	-57	-0.26	-53	-52	-90	-4.8	-8.4
-85	0	-58	-0.21	-53	-52	-85	-3.6	-10.1
-80	0	-58	0	-53.5	-52	-80	-1.92	-13.75
-75	0	-58	0	-55.5	-53	-75	-1	-18.5
-70	0	-58	0	-57	-54	-70	0	-34
-62	0	-58	0	-58.5	-54	-62	0	-35.3
-57						-57		

EIA Digital Audio Radio Test Laboratory

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Receiver #1

DELCO Adjacent Channel Characteristics

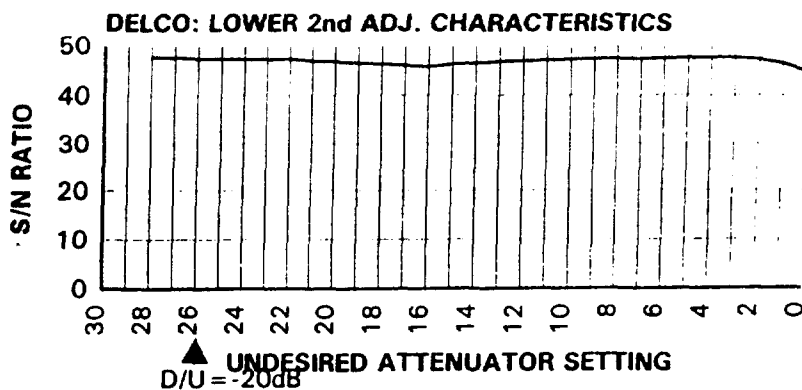
Lower second adj. channel 93.7mhz

Note:

- The results here represent a characteristic receiver input signature based on ramping the undesired signal up in 1dB increments and recording the signal to noise ratio.
- The measurements are made using a 15khz low pass and CCIR filters with quasi-peak detection
- The interfering signal is modulated with clipped pink noise
- SCA's (group B) are employed on both the desired and the undesired signals.

UNDES. ATTEN.	RADIO S/N (dB)
40	
39	
38	
37	
36	
35	
34	
33	
32	
31	
30	
29	
28	47.75
27	47.5
26	47.35
25	47.3
24	47.2
23	47.2
22	47.24
21	46.9
20	46.75
19	46.5
18	46.3
17	46
16	45.8
15	46.25
14	46.5
13	46.8
12	46.9
11	47
10	47.2
9	47.25
8	47.3
7	47.3
6	47.4
5	47.5
4	47.6
3	47.5
2	47.2
1	46.4
0	44.9

D/U = -20dB



Delco Auto Radio Adjacent Channel Characteristics

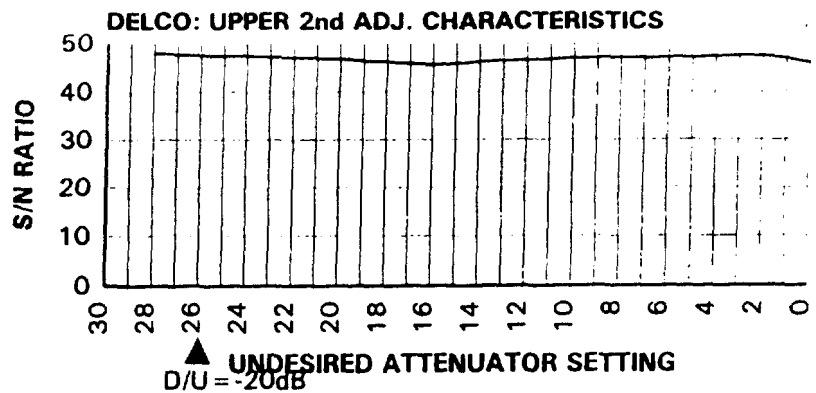
Upper second adj. channel 94.5mhz

Note:

- The results here represent a characteristic receiver input signature based on ramping the undesired signal up in 1dB increments and recording the signal to noise ratio.
- The measurements are made using a 15khz low pass and CCIR filters with quasi-peak detection
- The interfering signal is modulated with clipped pink noise
- SCA's (group B) are employed on both the desired and the undesired signals.

UNDES. ATTEN.	RADIO S/N (dB)
40	
39	
38	
37	
36	
35	
34	
33	
32	
31	
30	
29	
28	47.9
27	47.6
26	47.4
25	47.3
24	47.3
23	47.1
22	47
21	46.8
20	46.7
19	46.3
18	46.1
17	45.8
16	45.5
15	45.7
14	46.1
13	46.3
12	46.4
11	46.6
10	46.8
9	46.9
8	47
7	46.9
6	47
5	47.1
4	47.2
3	47.3
2	47.3
1	46.8
0	45.8

D/U = -20dB



Appendix B
Receiver Test Data

Laboratory Receiver #2

FM -> FM Laboratory Measurements for the Denon Model TU-380 RD

Type: High end home Hi-Fi

Measurements were made at a moderate signal level of -62 dBm.

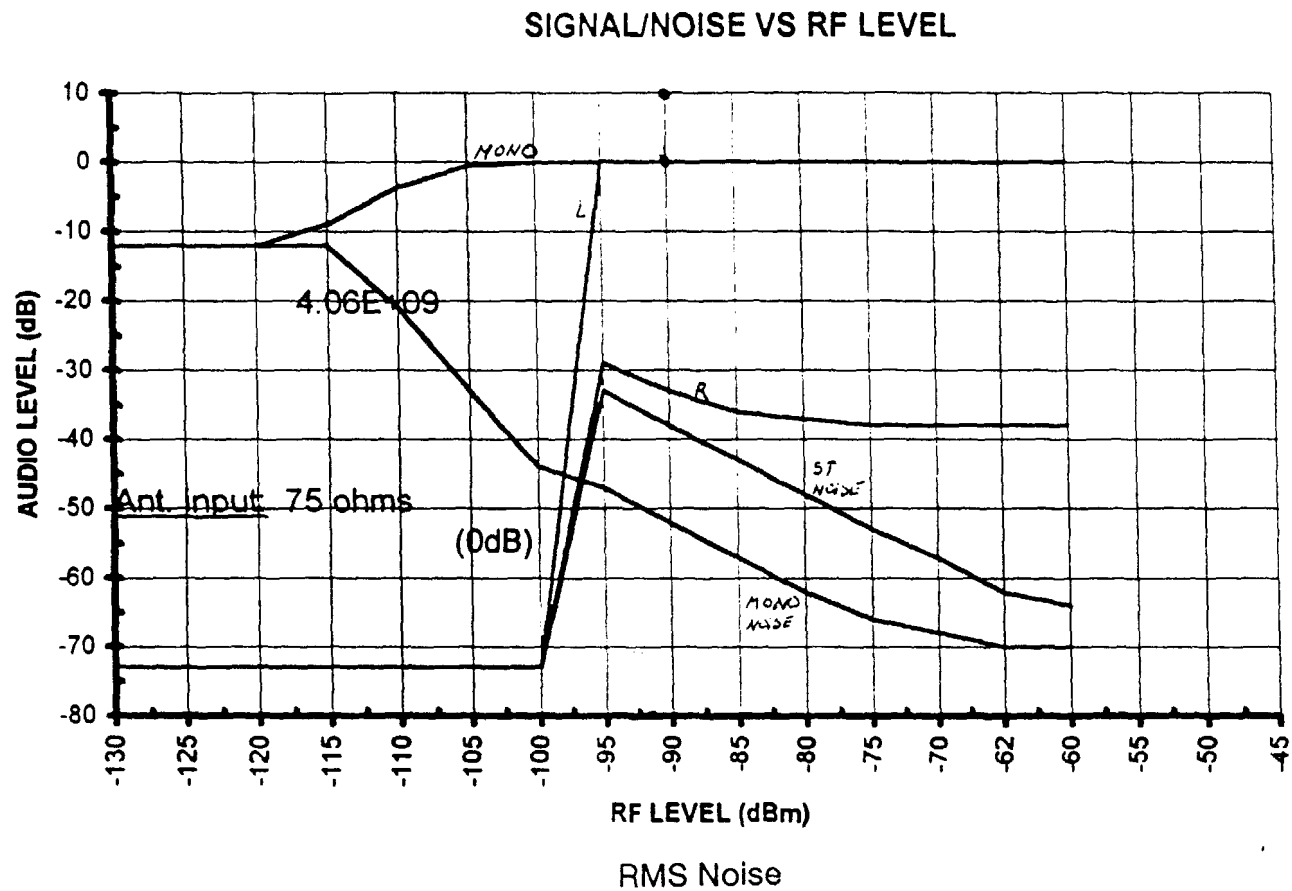
The signal to noise ratio was set at 45 dB and this measurement was made using a 15kHz low pass and a CCIR filter with quasi-peak detection.

Test Results:

Co-Channel	D/U 43.39 dB
Lower First Adjacent	D/U 23.61 dB
Upper First Adjacent	D/U 12.46 dB
Lower Second Adjacent	D/U -24.67 dB
Upper Second Adjacent	D/U -33.18 dB

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Receiver #2

CURVE DATA

SIGNAL, NOISE & SEPARATION VS RF LEVEL

RF Level	mono (L)		Stereo (L)			RF Level	Separation L -> R	
	Signal	Noise	Signal	Filt. Noise	Noise		Left	Right
dBm	dB	dB	dB	dB	dB	dBm	dB	dB
-130	-12	-12	-73	-73	-73	-130	-73	-73
-125	-12	-12	-73	-73	-73	-125	-73	-73
-120	-12	-12	-73	-73	-73	-120	-73	-73
-115	-9	-12	-73	-73	-73	-115	-73	-73
-110	-3.7	-21	-73	-73	-73	-110	-73	-73
-105	-0.6	-33	-73	-73	-73	-105	-73	-73
-100	-0.05	-44	-73	-73	-73	-100	-73	-73
-95	0	-47	0	-33	-33	-95	0	-29
-90	0	-52	0	-38	-38	-90	0	-33
-85	0	-57	0	-43	-43	-85	0	-36
-80	0	-62	0	-48	-48	-80	0	-37
-75	0	-66	0	-53	-53	-75	0	-38
-70	0	-68	0	-57	-57	-70	0	-38
-62	0	-70	0	-62	-62	-62	0	-38
-57	0	-70	0	-64	-64	-57	0	-38

Denon TU-380RD Adjacent Channel Characteristics

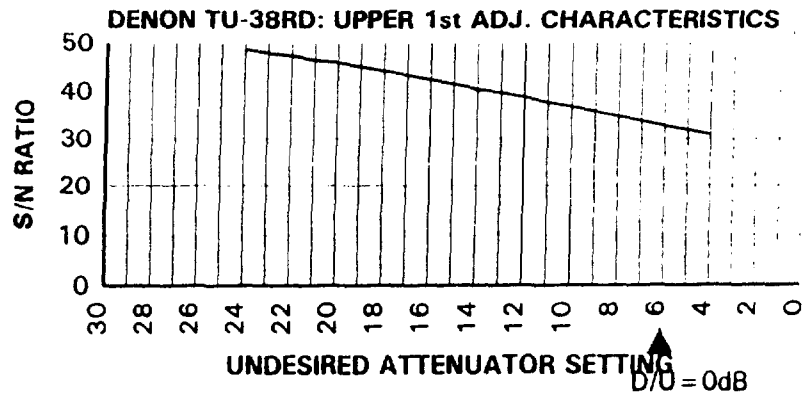
Upper first adj. channel 94.3mhz

Note:

- The results here represent a characteristic receiver input signature based on ramping the undesired signal up in 1dB increments and recording the signal to noise ratio.
- The measurements are made using a 15khz low pass and CCIR filters with quasi-peak detection
- The interfering signal is modulated with clipped pink noise
- SCA's (group B) are employed on both the desired and the undesired signals.

UNDES. ATTEN.	RADIO S/N (dB)
40	
39	
38	
37	
36	
35	
34	
33	
32	
31	
30	
29	
28	
27	
26	
25	
24	48.6
23	48
22	47.4
21	46.5
20	46
19	45.2
18	44.2
17	43.4
16	42.5
15	41.6
14	40.5
13	39.7
12	38.8
11	37.8
10	36.8
9	35.8
8	34.8
7	33.8
6	32.7
5	32
4	30.9
3	
2	
1	
0	

D/U = 0dB



Denon Adjacent Channel Characteristics

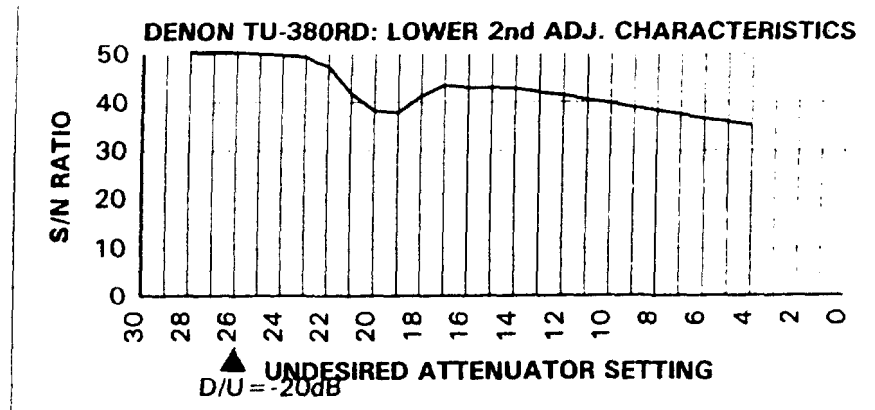
Lower second adj. channel 93.7mhz

Note:

- The results here represent a chacteristic receiver input signature based on ramping the undesired signal up in 1dB increments and recording the signal to noise ratio.
- The measurements are made using a 15khz low pass and CCIR filters with quasi-peak detection
- The interfering signal is modulated with clipped pink noise
- SCA's (group B) are employed on both the desired and the undesired signals.

UNDES. ATTEN.	RADIO S/N (dB)
40	
39	
38	
37	
36	
35	
34	
33	
32	
31	
30	
29	
28	50.5
27	50.5
26	50.5
25	50
24	49.8
23	49.3
22	47.4
21	41.9
20	38.2
19	37.9
18	41.3
17	43.5
16	43
15	43
14	42.8
13	42
12	41.4
11	40.5
10	39.8
9	38.9
8	38.3
7	37.5
6	36.6
5	36
4	35.2
3	
2	
1	
0	

D/U = -20dB



Appendix C

Receiver Test Data

Laboratory Receiver #3

FM -> FM Laboratory Measurements for the Panasonic Model RX-FS430

Type: Portable (Blaster)

Measurements were made at a moderate signal level of -62 dBm.

The signal to noise ratio was set at 45 dB and this measurement was made using a 15kHz low pass and a CCIR filter with quasi-peak detection.

Test Results:

Co-Channel	D/U	40.94 dB
Lower First Adjacent	D/U	27.33 dB
Upper First Adjacent	D/U	27.19 dB
Lower Second Adjacent	D/U	-22.41 dB
Upper Second Adjacent	D/U	2.16 dB